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THE USE OF AN EXTERNAL BYPASS DURING EXPERIMENTAL TOTAL HEPATECTOMY

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RECENTLY, a new method was described for complete one-stage hepatectomy in dogs.[1] The technique involved preliminary preparation of a side-to-side portacaval shunt and ligation of the portal triad. The inferior vena cava was then temporarily occluded above and below the liver, and the liver removed in a bloodless field by individual ligation of the hepatic veins with preservation of the inferior vena cava. During the 15 or 20 minutes of actual hepatectomy, the confluent (via the portacaval anastomosis) portal and inferior vena caval flow was blocked with no apparent permanent harm to the bowel. With release of the temporarily occluding caval clamps, free venous return of both the splanchnic and inferior vena caval drainage was immediately restored.

Since the publication of this technique, several investigators without formal surgical training have attempted to apply this method to their investigations at this institution. Their time for removal of the liver during portacaval occlusion has greatly exceeded the 15 or 20 minutes described by us. Some of their animals have developed hypotension or hemorrhagic gastroenteritis secondary to the prolonged portacaval hypertension. In order to avoid these complications and to make this experimental method useful to a larger number of investigators, an external by-pass has been developed which can be used during the period of liver removal to avoid the immediate and late effects of prolonged acute portal hypertension.

METHOD

Mongrel dogs of 20 to 40 kilograms are employed. The operation is performed essentially as previously reported.[1] After completion of the portacaval anastomosis, ligation of the portal triad, and mobilization of the liver, cut-downs are performed over the femoral vein in the femoral triangle and the external jugular vein in the neck. A ¼ inch (inside diameter) polyethylene catheter which has been siliconized† is inserted into the inferior vena cava through the femoral vein, led alongside the dog and inserted into the neck vein (Fig. 1). Temporary occlusion of the vena cava is immediately carried out, and the liver removed as previously described.[1] A brisk flow of blood from

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the inferior to the superior vena cava occurs through the external shunt as long as the portacaval pressure remains high or until clots form in the polyethylene catheter. If the period of portacaval occlusion is unduly prolonged, clots will form in the external shunt after 30 to 45 minutes. As soon as the liver is out and the vena cava released, the external shunt is removed, and the femoral and external jugular veins ligated. The duration of the operation is increased by no more than 5 or 10 minutes by the placement and removal of the external shunt.

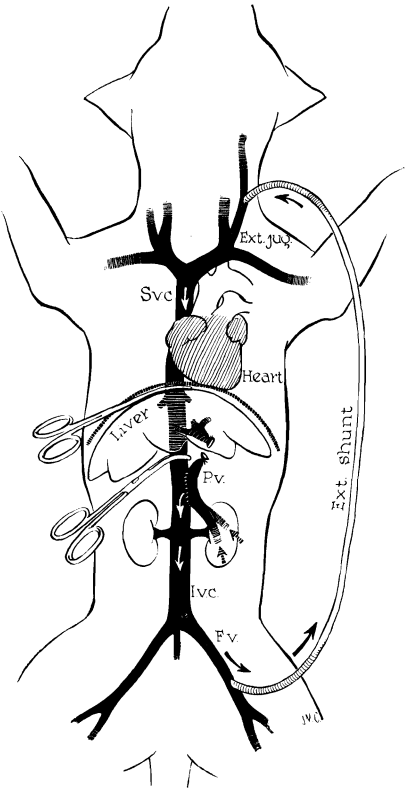

Fig. 1.—Polyethylene shunt from femoral to external jugular vein, which is used during the period of liver removal to decompress the portal and caval systems.

SUMMARY

An external bypass has been developed which is designed to prevent acute portacaval hypertension during the performance of a recently described method of hepatectomy. The temporary external shunt has considerably prolonged the safe period of portacaval occlusion, and extended the use of this method of hepatectomy to personnel relatively untrained in surgery.

REFERENCES

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